REPORT
INTERIM REPORT
FORMER SOLIDS MIXING AREA CLOSURE
US EPA ID IND 016360265
ATEC PROJECT NUMBER 8-3202

US EPA RECORDS CENTER REGION 5

August 10, 1990 File 8-3202

Mr. John Murphy
American Chemical Service

INTERIM REPORT

Solids Mixing Area Closure Griffith, Indiana



1501 East Main Street Griffith, Indiana 46319-0270 [219] 924-6690, FAX # [312] 375-8649

August 10, 1990 File 8-3202

Mr. Mitch Mosier Indiana Department of Environmental Management Plan Review and Permit Section P.O. Box 6015 Indianapolis, IN 46206-6015 Solid & Hazardous Waste Site Assessments
Remedial Design & Construction
Underground Tank Management
Asbestos Surveys & Analysis
Hydrogeologic Investigations & Monitoring
Analytical Testing/Chemistry
Industrial Hygiene/Hazard Communication
Environmental Audits & Permitting
Exploratory Drilling & Monitoring Wells

INTERIM REPORT

Former Solids Mixing Area Closure U.S. EPA ID IND 016360265

Dear Mr. Mosier:

Prior to initiating closure activities at the above referenced site, a sampling and analysis program has been performed in general accordance with the closure plan. The purpose of this report is to present the initial sampling and analysis results to IDEM, which shows ATEC's independent estimate of impacted soil quantities and concrete removal procedures.

Based on the results of the initial sampling and analysis program, we are recommending that the concrete in the mixing area be removed and disposed, and that impacted soils as delineated in this report also be removed and disposed. In order to keep to the schedule presented in the closure plan, removal should begin no later than August 17, 1990. If you have questions or comments regarding this project, please respond before August 17, 1990.

Very truly yours,

ATEC Associates, Inc.

BY:

Tris A. Miles

Environmental Manager

BY:

John W. Weaver, II Vice President

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Table 3.1 - Clean-up Objectives

1.0 INTRODUCTION

The study area is the former solids mixing area at American Chemical Service's (ACS) Griffith, Indiana facility. Earlier studies have suggested that the concrete pad and surrounding and underlying soils may contain elevated levels of heavy metals. The approved Closure Plan for the Former Solids Mixing Area, dated June 12, 1990, calls for the decontamination or removal of the concrete, and the removal and disposal of nearby soils containing significantly elevated levels of heavy metals (background mean plus one standard deviation).

The purpose of this report is to present the sampling and analysis results to IDEM for review. ATEC has estimated the amount of soil and concrete to be removed based on the initial sampling and analysis results in accordance with the closure plan.

2.0 SAMPLING PROCEDURES

Background samples were collected from five locations within the approved zone (Figure 1). The first step in the collection of the samples was to dig a small test pit using a backhoe. Approximately two inches of exposed soil was scraped from one wall of the pit using a clean stainless steel tool. Samples were collected at specified intervals from the newly exposed surface using another clean stainless steel tool. The samples were placed in new 500 ml plastic jars, labeled with a unique number, and documented by chain-of-custody protocol. To reduce lag time caused by waiting for analytical results, samples from all soil levels and locations specified by the closure plan in and around the solids mixing area were collected during the same event. Where possible, stainless steel bucket augers were used. If the soils at a given location were unsuitable for augering, the backhoe and spoon method was used.

Results for the background samples were statistically treated to determine clean-up objectives. The mean and standard deviation of the concentration of each metal at each soil level were computed, and added to produce the clean-up objective. See the Calculations appendix for details.

Analytical results for the samples collected in and around the solids mixing area were compared to the clean-up objectives. Additional samples were selected for analysis in accordance with the closure plan.

3.0 RESULTS

3.1 Background Levels

No detectable levels of arsenic, selenium, mercury or silver were present in any of the background samples. The clean-up objective for these metals at all locations is therefore set at the specified quantitation level.

There was no observable trend in the concentrations of barium, cadmium, chromium, nickel and lead. The levels did not increase or decrease consistently with depth. Table 3.1 shows the clean-up objectives for each soil level. Concentrations in discrete samples are presented in the Analytical Data Appendix.

3.2 Solids Mixing Area Samples

Concentrations of metals above clean-up levels were present in several of the samples collected in and around the solids mixing area. Lead, chromium and cadmium appear to be the most frequently encountered metals whose presence may be attributable to past operations in the solids mixing area.

Barium was identified at levels above the computed clean-up objective at many locations. Barium is a common, naturally occurring element in the area of the subject site. It was present in nearly all of the background samples. The distribution of barium in the mixing area did not follow a discernable pattern. Elevated barium concentrations were frequently detected in samples where no other metals were detected.

3.3 Extraction Procedure Toxicity (E.P. - TOX) Testing

In accordance with the closure plan, splits of samples found to contain metals concentrations above clean-up levels were analyzed via E.P. TOX methodology. E.P. TOX concentrations for all metals in all samples were below quantitation limits. A complete set of results is in the laboratory data appendix.

A core sample of the concrete floor of the mixing area was also analyzed for E.P. TOX metals. No metals were present above quantitation levels in this sample.

4.0 RECOMMENDATIONS

4.1 Concrete

The closure plan allows for either decontamination or removal of the concrete pad and sidewalls. Since elevated levels of metals were detected in soils underlying the pad, removal of the pad will be necessary to access the soil. We believe that removal is preferable to decontamination for economic and health and safety reasons as well.

We have learned from permitted landfills that concrete pieces with dimensions less than four feet are acceptable. The concrete could be broken into pieces of this size easily, and the process would generate little or no airborne dust.

If significant quantities of dust is observed during the concrete sizing operation, dust control by water application is recommended. The amount of water applied would be just enough to control the dust. No runoff is anticipated.

4.2 Soils

Analytical results indicate that concentrations of metals (barium, cadmium, chromium, lead and nickel) were above the clean-up level mainly above a depth of two feet below grade. The sampling indicates that a few locations had slightly elevated lead and chromium levels below a depth of two feet. These metals will be used as indicators in the excavation of soil in the former solids mixing area.

It is our opinion that the levels of barium identified in samples collected at the solids mixing area are not a result of activities in that area, and that barium is not a true indicator of contamination at the solids mixing area. Available literature indicates that barium concentrations in soils in the continental United States range from 15 to 5,000 parts per million (ppm)¹. Background data for barium collected by ATEC at several sites in the region of the subject site indicates an average concentration of 67.9 ppm (see Appendix B).

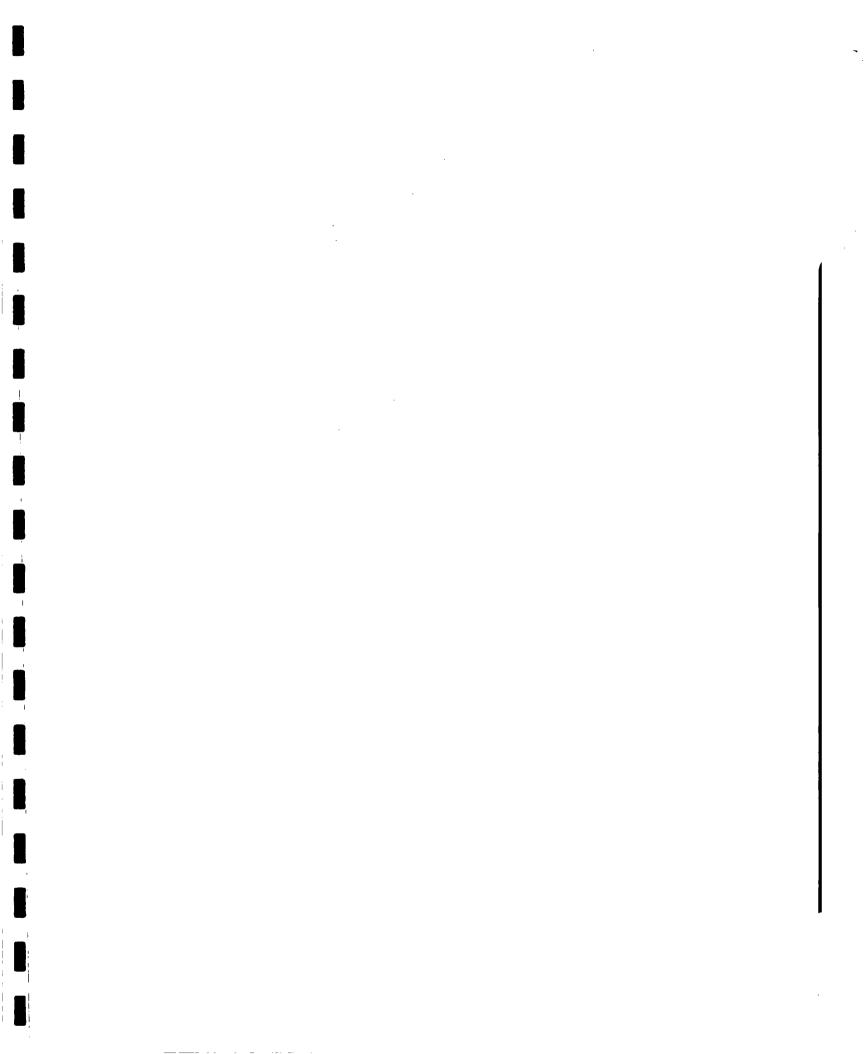
Averaging the barium concentration in all samples from the mixing area yields a mean concentration of 30.92 ppm, compared to a mean concentration of 26.89 ppm for all background samples. Analysis of those samples containing the highest concentrations of total barium via the extraction procedure toxicity test (EPA SW 846 Methods 6000 and 7000 Series) showed that no detectable levels of extractable barium are present.

The occurrence of barium in the mixing area does not appear to follow any pattern. If the barium was traceable to past activities at the mixing area, concentrations would be expected to be higher in the upper soils. Plotting barium concentrations versus sample locations produces cross sections (Figures 2 through 6) which show that this is not the case.

We believe that barium occurs naturally in site soils. The variation in concentrations between sampling points is likely due to variations in the types of fill material used to bring the site up to its present grade.

Concentrations of metals of concern exceeding the clean-up objectives occur most frequently in the depth interval of 0 to 24 inches in the southern half of the mixing area. The southern half of the controlled work zone also evidenced elevated levels of lead. We believe that the top two feet of soil should be excavated below and to the south of the mixing area. One foot of soil should be excavated in the north portion of the mixing area (see Figure 7). After the excavation of soil is complete, confirmatory soil samples will be obtained to verify that clean-up objectives have been met. If clean-up objectives are not obtained, an additional six inches of soil will be removed. Confirmatory soil samples will again be taken and analyzed.

¹ McElroy, et. al., 1976, Heavy Metal Concentrations in Surficial Materials in the United States



APPENDIX A CALCULATIONS

CALCULATIONS

BORING NUMBER	BARIUM MEAN VALUE (PPM)
B-1	15
B-2	35.06
B-3	41
B-4	80.1
B-5	64
B-6	70.7
B-7	22
B-8	12.2
B-9	12
B-10	15.3
B-11	12.7
B-12	13.22
B-13	
B-14	
B-15	
B-16	11
B-17	
B-18	
B-19	45.5
B-20	41.57
B-21	30
B-22	19.55
B-23	49
B-24	23
B-25	26.68
B-26	23.43
B-27	17.15

680.16 = 30.92 22

30.92 MEAN BARIUM CONCENTRATION IN MIXING AREA

Sample Date ACS

Date 8-1-90

Monitoring Well __S6

ву 🥂 😂

Analysis BARIDIA

Checked By

Measurments:

1) 12

3) <u>6:5</u>

4) <5

D.L. = _____ (Detection Limit)

s= 10.06 (Variance of measurements above limit of detection)

X' = 10.17 (Mean of measurements above limit of detection)

 $T = \frac{(.38)}{(x'-D.L.)}$

h= 0.25 (Proportion of values below detection limit)

gamma= <u>6.38716</u>

X= _______ [X=X'-(gamma)*(X'-D.L.)]

 $s = \frac{2}{15.52} \left[s = s + (gamma) * (X'-D.L.) \right]$

Analysis BARNM

Checked By _____

Measurments:

$$X' = 6.73$$
 (Mean of measurements above limit of detection)

$$T = \frac{1.65}{1.65} [T = (S/(X'-D.L.))]$$

Sample Date ACS
Monitoring Well 54

BY R. STRIMBU

Analysis BARIUM

Checked By

Measurments:

1) <5

3) ______

2) <5

4) <u>6.2</u> 5) <u>5.4</u>

D.L.= _____(Detection Limit)

2' 0.32 (Variance of measurements above limit of detection)

 $X' = \frac{6.8}{6}$ (Mean of measurements above limit of detection)

 $T = \frac{0.5}{100} [T = (s'/(x'-D.L.))]$

h= 045 (Proportion of values below detection limit)

gamma= 1.221

 $X = \frac{4.74}{[X=X'-(gamma)*(X'-D.L.)]}$

2 S= 1.16 [S=S +(gamma)*(X'-D.L.)]

Sample Date / Sample Date

Date _____

Analysis She De

Checked By _____

D.L.= (Detection Limit) () 45

2'
S= ____(Variance of measurements above limit of detection)

 $X' = \frac{60.2}{}$ (Mean of measurements above limit of detection)

 $T = \frac{2'}{(X'-D.L.)}$

h= _____(Proportion of values below detection limit)

X= ____[X=X'-(gamma)*(X'-D.L.)]

2 S= [S=S +(gamma)*(X'-D.L.)]

Analysis Fat Just

Checked By

Measurments:

$$X' = \frac{69.3}{69.3}$$
 (Mean of measurements above limit of detection)

$$T = \frac{2'}{(X'-D.L.)}$$

Sample Date $\frac{ACS}{8-2G}$ Monitoring Well $\frac{8-2G}{8}$

Date <u>2/1-98</u>

By <u>RTS</u>

Analysis BAROUN

Checked By

Measurments:

1) ______

3) _____

2) _6.2

4) <u>5.3</u>

5) <5

D.L.= _____(Detection Limit)

2' 5/33 (Variance of measurements above limit of detection)

 $X' = \frac{33.12}{}$ (Mean of measurements above limit of detection)

T = 3.33 [T = (S/(X'-D.L.))]

h= (Proportion of values below detection limit)

gamma= <u>177 71</u>

X= _____[X=X'-(gamma)*(X'-D.L.)]

2 S= 2,05 (S=S+(gamma)*(X'-D.L.)]

Analysis 64000

Checked By _____

Measurments:

2' S= _______(Variance of measurements above limit of detection)

X' = 38.07 (Mean of measurements above limit of detection)

$$T = \frac{2'}{(X'-D.L.)}$$

h= 0.17 (Proportion of values below detection limit)

gamma= <u>*******</u>

$$s = \frac{2}{2.522.60} [s = s + (gamma) * (X' - D.L.)^{2}]$$

Sample Date _ Monitoring Well ______55____

By AReeve

Analysis Barum

Checked By

Measurments:

1) _ < 5

2) 9.3

4) _ 5 4

D.L. = 5 (Detection Limit)

2'
S= 7.61 (Variance of measurements above limit of detection)

 $X' = \frac{7.35}{}$ (Mean of measurements above limit of detection)

$$T = \frac{2!}{(X'-D.L.)}$$

h= _____ (Proportion of values below detection limit)

gamma= 1.095

Sample Date _____

Date 7/11/90

Monitoring Well 54

By A, 2.000e

Analysis Barrom

Checked By

Measurments:

1) ____<5___

3) ___ < 5

2) _ < 5

4) ___6.2

D.L.= 5 (Detection Limit)

2'
S= _____(Variance of measurements above limit of detection)

X' = 62 (Mean of measurements above limit of detection)

h= _______(Proportion of values below detection limit)

gamma= 1.569

$$X = \frac{2.76}{1.00} [X = X' - (gamma) * (X' - D.L.)]$$

$$s = \frac{2}{2.69} \left[s = s + (gamma) * (X'-D.L.)^{2} \right]$$

Date 7/.1/90 Sample Date ____ By A. Recoe Monitoring Well 55 Analysis <u>Cadmium</u> Checked By _____ 3) ____< 1) _ < \ Measurments: 4) 1.0 2) ___ < \ D.L.= (Detection Limit) 2'
S= _____(Variance of measurements above limit of detection) X'= ____(Mean of measurements above limit of detection) $T = \frac{2'}{(X'-D.L.)}$ h= .75 (Proportion of values below detection limit) gamma= 1.669

X= ____[X=X'-(gamma)*(X'-D.L.)]

2 S= _____(S=S +(gamma)*(X'-D.L.)]

Sample Date		Date <u>7/1/170</u>
Monitoring Well	54	By AReave
Analysis	<u>Cadmion</u> Checke	ed By
Measurments:	1)	3)
	2)	4)
		·
D.L.=	(Detection L:	imit)
2 ' S=	(Variance of	measurements above limit of detection)
X * =	(Mean of meas	surements above limit of detection)
Т=	[T=(S /(X'	-D.L.))]
h=	(Proportion of	of values below detection limit)
gamma=	<u> 1.869</u>	
X=	[X=X'-(gamma)	*(X'-D.L.)]
2	2 2	2 0+(v! p:r) 1

Sample Date _____

Date 7/11 90

Monitoring Well 51

By _ A. R 20 18

Analysis Chromom

Checked By _____

Measurments:

1) 67

2) _ 7 2___

4) < 5

D.L. = ______ (Detection Limit)

2' S= <u>.163</u> (Variance of measurements above limit of detection)

 $X' = \frac{(6.77)}{(Mean of measurements above limit of detection)}$

$$T = \frac{2'}{.052} [T = (S/(X'-D.L.))]$$

h= .25 (Proportion of values below detection limit)

gamma= _.32828

Sample Date _____

Date 7/1/190

Monitoring Well 55

By A Reeve

Analysis Nickel

Checked By _____

Measurments:

1) ____<5___

3) _____ 45___

2) <5

D.L. = 5 (Detection Limit)

S= _____(Variance of measurements above limit of detection)

X' = 74 (Mean of measurements above limit of detection)

h= <u>75</u> (Proportion of values below detection limit)

gamma | 869

X = 2.91 [X = X' - (gamma) * (X' - D.L.)]

Sample Date _____

Date 7/11/90

Monitoring Well 54

By A Reeve

Analysis Nickel

Checked By _____

Measurments:

3) _ < 5

2) < 5

4) _ < 5

D.L.= 5 (Detection Limit)

2'
S= _____(Variance of measurements above limit of detection)

 $X' = \frac{7.5}{}$ (Mean of measurements above limit of detection)

$$T = \frac{2!}{(X'-D.L.)}$$

h= .75 (Proportion of values below detection limit)

gamma= 1.869

$$X = 2.83 [X = X' - (gamma) * (X' - D.L.)]$$

$$s = \frac{2}{11.68} \left[s = s + (gamma) * (X' - D.L.) \right]$$

Sample Date ____

Monitoring Well <u>53</u>

By A. Reove

Analysis Nickel Checked By

Measurments:

1) ______

D.L.= 5 (Detection Limit)

2'
S= _____(Variance of measurements above limit of detection)

 $X' = \frac{72}{Mean}$ (Mean of measurements above limit of detection)

 $T = \frac{2}{(X'-D.L.)}$

h= _____(Proportion of values below detection limit)

gamma 1.869

 $X = \frac{3.09}{100} [X = X' - (gamma) * (X' - D.L.)]$

 $s = \frac{2}{S} = \frac{9.05}{[S=S + (gamma)*(X'-D.L.)]}$

Sample Date _____

Date 7/11/96

Monitoring Well 52

By A Recue

Analysis Nickel Checked By _____

Measurments:

1) _<5

2) ___<5

D.L. = _____ (Detection Limit)

2' C (Variance of measurements above limit of detection)

X' = 22 (Mean of measurements above limit of detection)

$$T = \frac{2'}{T = (S'/(X'-D.L.))}$$

h= .75 (Proportion of values below detection limit)

gamma= 1.869

$$X = \frac{-977}{[X=X'-(gamma)*(X'-D.L.)]}$$

$$s = \frac{2}{540.1} \left[s = s + (gamma) * (X'-D.L.) \right]$$

Sample Date _____

Date 7/11/90

Monitoring Well 5

By A Reeve

Analysis Mickel

Checked By ____

- Measurments: 1) _______
- 3) __<5__
- 2) _ < 5

D.L.= 5 (Detection Limit)

2'
S= ______(Variance of measurements above limit of detection)

X' = 56 (Mean of measurements above limit of detection)

$$T = \frac{2'}{(X'-D.L.)}$$

h= 75 (Proportion of values below detection limit)

gamma= 1.869

$$X = 448 [X = X' - (gamma) * (X' - D.L.)]$$

$$s = \frac{2}{673} [s = s + (gamma) * (x' - D.L.)]$$

Sample Date _____

Date 7/11/90

Monitoring Well 55

By A. Reeve

Analysis Lead

Checked By _____

Measurments:

1) ____<5___

3) 5.6

2) ___<5

4) ____73__

D.L.= 5 (Detection Limit)

2'
S= | (Variance of measurements above limit of detection)

X' = 645 (Mean of measurements above limit of detection)

$$T = .684 [T = (S/(X'-D.L.))]$$

h= _____(Proportion of values below detection limit)

gamma _ 1.027

$$X = \frac{1.96}{(x=X'-(gamma)*(X'-D.L.))}$$

$$\frac{2}{s} = \frac{3.60}{5} = \frac{22'}{(s=s)*(x'-D.L.)}$$

Sample Date _____

Date 7/11/90

Monitoring Well 53

By A Reeve

Analysis Lead Checked By _____

Measurments:

1) _ <5

2) _ < 5

4) _ 5.7

D.L. = 5 (Detection Limit)

2'
S= _____(Variance of measurements above limit of detection)

 $X' = \frac{5.7}{}$ (Mean of measurements above limit of detection)

T = C [T = (S/(X'-D.L.))]

h= 75 (Proportion of values below detection limit)

gamma= 1.869

 $X = \frac{3.69}{9} [X = X' - (gamma) * (X' - D.L.)]$

2 S= <u>'92</u> [S=S +(gamma)*(X'-D.L.)]

Sample Date _____

Monitoring Well _ S2_

By AR

Analysis Lead

Checked By

Measurments:

1) _120

3) 7.3

2) _ < 5

4) _ < 5

D.L. = _____ (Detection Limit)

s = 635.6 (Variance of measurements above limit of detection)

X' = 63.7 (Mean of measurements above limit of detection)

$$T = \frac{2'}{(X'-D.L.)}$$

h= ______(Proportion of values below detection limit)

gamma= <u>18881</u>

$$X = \frac{11.6}{[X=X'-(gamma)*(X'-D.L.)]}$$

$$s = \frac{3696}{5} [s = s + (gamma) * (X' - D.L.)]$$

Sample Date _____

Date 7/10190

Monitoring Well 52

By A Recue

Analysis Chromium

Checked By _____

Measurments:

1) ____<5

3) _ < 5

2) _ < 5

4) _____

D.L.= 5 (Detection Limit)

2'
S= _____(Variance of measurements above limit of detection)

 $X' = \frac{15}{15}$ (Mean of measurements above limit of detection)

 $T = \frac{0}{(X'-D.L.)}$

h= .7.5 (Proportion of values below detection limit)

gamma = 1.869

 $X = \frac{-3}{69} [X = X' - (gamma) * (X' - D.L.)]$

 $\frac{2}{S = 186.9} \left[S = S + (gamma) * (X' - D.L.) \right]$

non-normal

Sample Date _____

Monitoring Well 52

By A Reeve

Analysis Cd

Checked By _____

Measurments:

3) _ < \

$$X' = \frac{2 \cdot 1}{2 \cdot 1}$$
 (Mean of measurements above limit of detection)

$$X = \frac{3045}{3} [X = X' - (gamma) * (X' - D.L.)]$$

APPENDIX B BACKGROUND CONCENTRATIONS OF METALS IN SOILS

BACKGROUND CONCENTRATIONS OF METALS IN SOLS EPA/600/2-86/066 August 1986

RECLAMATION AND REDEVELOPMENT
OF CONTAMINATED LAND:
VOLUME I. U.S. CASE STUDIES ... CASE STUDIES

G. L. Kingsbury and R. M. Ray
Research Triangle Institute
Research Triangle Park, NC 27709

A CONTRACTOR OF THE STATE OF TH Application of the second section of

Contract No. 68-03-3149, 23-1

Project Officer

Naomi P. Barkley Land Pollution Control Division Hazardous Waste Engineering Research Laboratory Cincinnati, Ohio 345268

HAZARDOUS WASTE ENGINEERING RESEARCH LABORATORY OFFICE OF RESEARCH AND DEVELOPMENT U.S. ENVIRONMENTAL PROTECTION AGENCY CINCINNATI, OHIO #45268 👭 🔡

TABLE B-16. REPORTED LEVELS OF SELECTED ELEMENTS IN SOILS

Element	Concentration in soil (µg/g)	Reference
Arsenic	5 average 6 common 0.1-40 range May reach several hundred ppm in soils overlying deposits of sulfide ores	1 2 2
Aluminum j	Ubiquitous in soil: as high as 40,000 ppm in some Great Plains soils Availability extremely low in soils with pH > 5.0	
Boron	10 common 2-100 range	2
Cadmium	0.06 common 0.01-7 range	2,4 <u>3</u>
Chromium	100 common 5-3,000 range 50-170 1,000 in serpentine soils	
Cobalt	8 common 1-40 range <1 extractable	2 2 3
Copper	20 common 2-100 range 0.2-3.2 extractable	2 2 3
Iron	20,000-50,000 1-100 extractable	3
Lead	10-30 10 common 2-200 range 60 and 275reported mean rural levels	3,5 2 2 6
Manganese	850 common 100-4,000 range 1-47 available	2 2 3
	(Continued)	

TABLE B-16. (Continued)

STATE OF THE PROPERTY OF THE PARTY OF AND THE RESIDENCE OF THE PARTY OF THE PARTY

Element	Concentration in soil Reference
Hercury	Co. a. A. S. Convenile in western U.S.;
	mean 0.083 0.147 mean for eastern U.S.
Molybdenum Wolsenum	2 common 2 2 0.2-5 range 3
Topic State in the state of the	Montana soils Flavated levels may occur in alkaline
	50113 WICH HIGH WOOD 2
Nickel Mickel	40 common 2 10-1,000 range 7
	5-40
Selenium	0.5 common 0.1-2.0 range
- Vanadium	100 common 20-500 range
Zinc	50 common 2 10-300 range 8 5,000

NO BUILD STREET



Hazardous Waste Research Locator

United States
Environmental Protection
Apency

Hazardous Wests Engineering Research Laboratory Cinchneti, OH 45268

EPA/600/9-87/007

Research and Development

Davis 34 051 50 Mars

P A6

Technical Literature

1542 1.1 ications

18. Guidance Manual on Overtopping Control Techniques for Hazardous Waste Impour ments EPA 600/2-86-012 PB86-164168

Carolifet (Alexandra) (Co.)

Drum Handling Practices at Hazardoue Waste Sites EPA 600/2-86-013 PB86-165362

20. Interim Protocol for Olving Operations in Contaminated Water EPA 600/2-88-130 PB86-128022

21. Reclamation and Redevelopment of Contaminated Land; Volume 1, U.S. Case Studies EPA 500/2-85-065 PB87-142121

22. Summary of On-Scene Coordinator Protocol for Contaminated Underwater Operati EPA 600/D-84-040 PB84-149707

RCRA Resource Conservation and Recovery Act

re 9/1/58 Compendeur of Surveyund ist Dientes Called 7/26/88 By dhe

Evaluating Cover Bystams for Solid and Hazardous Waste 94170 3 487.46 SW-867 GPO 055-000-00228-2 PB 87-154.674170 3 487.46

8. Guide to Disposal of Chamically Stabilized and Solidified Westes

8W-874 GPO 008-000-00232-1

9. Solld Waste Lasching Procedure SW-924 OSW

11. Hydrologic Evaluation of Landfill Performance (HELP) Model

Volume I: Users Manuel EPA 530/SW-84-009 ORD Volume II: Documentation EPA 530/SW-84-010 ORD Model Version 1.0 - Model Simulation (Includes above 2 volumes) EPA/DF-85-001 P885-100725/REB

12. Technical Guidance Document, Construction Quality Assurance for Hazardous Wast Land Disposal Facilities

EPA 630/5W-86-031 ORD 13. Characterization of PCB Transformer/Capacitor Fluids and Correlation with PCDD's and PDCF's in Soot

EPA 600/2-87-004 PB87-145785 14. Use of Lined Pits for Disposal of Dituts Peaticide Waste

EPA 600/2-87-003 PB87-145926 15. Technical Resource Document: Treatment Technologies for Solvent Containing Wast. EPA 600/2-86-095 PB87-129821

16. Technical Resource Document: Treatment Technologies for Dioxin Containing Wastes EPA 600/2-86-098 P887-110613

17. Alternative Technologies for Managing Solvent Wastes

EPA 600/5-86-040 PB86-195858

18. Treatment Technologies for Corrosive Hazardous Westes EPA 600/5-86-108 PB86-224565

19. Hazardous Weste Thatment Technology EPA 600/d-86-006 PB86-146539

20. Microbial Decomposition of Chloringted Arometic Compounds EPA 600/2-86/090 ORD

21. PCB Sediment Decontamination Technical/Economic Assessment of Selected Alternative Treatments EPA 600/2-86-112 P887-133112

22. Summary of On-Scene Coordinator Protocol for Contaminated Underwater Operation EPA 600/D-84-040 PB84-149707

23. Interim Report on the Feasibility of Using UV Photolysis and APEG Resignit for Tratment of Dioxin Contaminated Soils EPA 600/2-85-083 PB85-232619

SW-867 GPO 055-000-00228-2 PB 87-/54-694

2. Hydrologio Simulation of Solid Waste Disposal Sites
SW-868 GPO 055-000-00225-8

3. Landfill and Surface Impoundment Performance Evaluation
8W-869 GPO 055-000-00233-8

4. Uning Waste Impoundment and Disposal Facilities
SW-870 PB86-192796

Name of Hazardous Waste Laschete
SW-871 GPO 005-000-00224-0 16 81-189-257

SW-871 GPO 005-000-00224-0 16 81-189

SW-872 GPO 005-000-002278-8

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SW-872 GPO 005-000-002278-8

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SW-872 GPO 005-000-002278-8

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600 /2-25-106

HEAVY METAL CONCENTRATIONS IN SURFICIAL MATERIALS IN THE UNITED STATES (McElroy et al., 1976)

				The graph of a contract of			e english te		
	. (Arlthm	tic enalysi			Ceomet	ric means	:	. •
		VAALEE			Conterminous U.S.	. Heet	08497th 94	tast of	:97+h
	Elemenc		(22		(ppm)		idisn	merid	
	Arsente 1-	42-10		erate in a section of	TPDM/ Francisco	11.6	pm)	(ppm)	
W. Say	Barium /o		< 1,000			(·	gstanson e ell •		
8 - A - A	Cadmium o		15-5,00	00	430			••	
	Cerium		< 20	14 (M) (12 H).	i dia dia mandria dia dia Mandria dia mandria dia dia dia dia dia dia dia dia dia d		60	300	
	Chromium	86	< 150-3		75			••	
	Cobalt	10	1-1,500	rational and the last	37# Sep		74 38 (**)	78,	.,
To give the in-	Copper &- H	50	< 3-70	मित्रिक्षणिक्ष वेष्ट्रमण्डे की अस्तर है। '	-		38	36	
State Na	Iron \$000-10	വ പ	< 1-300		18		. 0 7	7	
	Callium	22,000.	100-100,	000	18 000			14	
1.70	Cermenium	19	< 5-70	realist to	14 mg	* * * * * * * * * * * * * * * * * * *	· delication	15,000	
	Cold		\ 10					10	aid.
	Hafnium		~ 20			Name of the second			
र हा लीहा ।	Indium	ig in Ne TilMi ••	< 100 1888 < 10	Marie Marie (Marie Marie M Marie Marie Ma	AND MALES LINES CONT.	•	. Here english e ■		• • •
	Lanthanum	41	< 30-200	gravitation and	95 6 1996 - 1874			•	-
200	Lead - 200/10	· · · · · · · · · · · · · · · · · · ·	< 10-700°	Balancia di A	34,4	33	A STATE OF THE STA		ët.
	Woo-Kanganese 20	- 300/100360 ···	< 1-7,000		16 \	18		14	riė.
	Molybdenum :	· · · · · · · · · · · · · · · · · · ·	. < 3-7	Andrews Co.	340	389	Market Carlot	285	1.5 191
	Keodymium	45	< 70-300	1 2首なスカセルンタ		•			\$
a Marketina	Mickel 5-500	/ xxx 20	< 5-700 m		39 14	36	KU to version	44	15.
	X1ob1um	,13	< 10-100		12	16			4
	Palladium Platinum		< 1.			11	· · · · · · · · · · · · · · · · · · ·	13	નું
	Rhenium		< 30				and the second	• •	**
	Scand (um	••	< 10		••				
• •	Strontium	10	< 5-50			-			
	Tantalum	240	< 5-3,000		-120	9		. 7	
	Tellurium		< 200			210		51	
	Thellium		< 2,000		••			,	
	Thorium	••	< 50			••			
	Titanium		< 200		••				
•	Uranium	3,000	300-15,000	2,	300	2,100		4.	
	Vanadium	••	< 500		N	1,100	• .	3,000	Ş.
	Ytterbium	76	< 7-500		56	66	. 4		
•	Yttrium	20	< 1-50		3	. 3		46	Os
to les	Zinc 10-300/50	29 54	< 10-200		24	25		J 11	Ÿ.
	Zirconium	240	< 25-2,000	. 3	44	51		14	
	Silver 5-150		< 10-2,000	- Av.	200	170		250	er e
	Total	30,099	•	21,9					Ä.
	•	•		21,9	91	23,858	19	,263	
	_							•	

indicates all enalyses showed element to be below detectable limits. Selenium

DATA BASE RCRA TOTAL AND EP TOX HEAVY HETEALS CHICAGO AREA AND MORTHWEST INDIANA

										_	
FILd #	CLTA	SAMPLE #	ANALYSIS	Ar	Ва	Cd	Cr	Pb	Нд	Se	Ag
*****	*****	*****	*****	****	****	****	*****	*****	****	*****	*****
7-3213	Niles, IL	bkgrd	JATOT	2	79		Ìó	22	Ø.4	1	Ø.5
		1	and the same	2.7	7ö	Ø.5	14	23	0.4	1	1
		1A	41	2.7	90	Ø.5	. 12	23	0.4	1	1.3
* · · ·		2	11	4.6	99	0.5	13	21	0.4	1.	1.4
		2A	.11	4.8	71	Ø.6	22	T/08	ø.8	1	0. 8
7-3281	Alsip, IL	1	1OTAL	3.3	8,55	0.6	54. د	16	Ø.Ø5	Ø.39	2.97
		2	tr	4.8	<i>5</i> 6	1.57	8.7	39	0.05	0.93	2.95
		3	"	5.9	41.9	1.54	9.49	32	0.05	ø . 99	2.8
		4	Ħ	6.3	41.1	1.61	9.12	46	Ø. <i>ð</i> 5	Ø.4	2.98
7-3278	Alsip. IL	1	TOTAL	7.5	33.3	2.42	11.4	25	0.05	Ø.39	2.9
	_	2	41	6.4	121	1.79	10.6	25	Ø.05	8c.0	2.89
		3	11	10.1	75.8	1.17	13.9	27	0.05	0.34	2.56
7-3235	Rling Mdw	1	TQ1,VT	13.2	33. 3	Ø.309	14.j	47	0.05	1	2.92
	_	2	11	11	63.8	0.367	13.6	48	0.4	1	1
7-3185	Alsip. IL	1	101'AL	1.2		1.7	0.9	9.7	9.4	1	1.2
	-	2	11	2.2		2.9	5.2	18	0.4	1	Ø . 5
		3	Ħ	2.3		2.1	3.4	8	0.4	1	D. 7
		· A	п	3.5		Ø.5	13	15	0.4	1	Ø.7
		F	tr	6.4		Ø.5	16	17	0.4	1	Ø . 5
	• 1	G	H ,	6.3		Ø.5	18	. 21	0.4	1	W.6
7 5120	Gary	2	TOTAL	2	510	1	7.7	31	Ø.05	0.0	13
		27	11	4	50	1	6.4	66		5	9.5
7-3068	Des Plns	1	LATC 1	3.9	87.7	1.04	12.8	34.4	0.05	1	2.96
		2	11	5.1	64	1.69	11.6	85.7	0.061	1	2.94
	•	3	¢1	3.1	7ō.7	1.4	10.9	41.9	0.079	Ţ	3.75
		4	- 11	1.9	70.9	6.83	11.5		0.067	1	3.43
	:	5	11	2	56	2.34	12.3		Ø.087	1.	2.95
		6	11	3.5	63.9		13.4		0.051	1	5.8
	-	7	II.	3.1	73.5	2.27	13.4	114	Ø.Ø63	. 1	4.43
		- 8		- 4	66.3	2.01	26.1	153.6	0.05	1	2.99

Mean = 4.55 67.9 1.483 11.81 49.33 0.208 1.014 2.830 STD = 2.843 12.51 1.230 5.109 44.98 0.196 0.776 2.638

DATA BASE RCRA TOTAL AND EP TOX HEAVY METEALS CHICAGO AREA AND NORTHWEST INDIANA

FILE	CITY	SAMPLE	AMAL	212	· Ar	ва	Cd	Cr	Pb	Нд	Зe	Ag	
#		#			(mg/:	1 (mg/	1 (mg/1	(ing/	1 (mg/	1 (mg/.	1 (mg/1	(ing/1)	

7-3213	Niles, IL	bkgrð	ciP 1	χO	0.05	2	0.1	0.5	1.5	0.5	0.002	0.5	
•		Ĭ	1	•	0.05	2	0.1	Ø.5	0.5	Ø.5	0.002	2.5	
_		1A	. •	•	Ø.∂5	2	0.1	Ø.5	0.5	৶.5	0.002	0. 5	
		2	41	•	Ø.05	2	2.1	Ø.5	0.5	0.5	Ø.002	0.5	
		2A	•	•	0.05	2	Ø.1	Ø.5	1.3	0.5	0.002	U. 5	
6-3184	CHICAGO	1	EP T	XO.	0.5	10	Ø . 5	0.5	0.5	0.02	0.1	0.5	
		2	5 1	•	0. 5	10	⊌. 5	0.5	0. 5	0.02	3.1	0. 5	
		3	•	1	0.5	19	Ø.5	0.5	₽.5	0.02	2.1	D.5	
		.4 .	**	٠.	0.5	. 10	0.5	Ø.5	2. 5	0.02	0.1	0.5	
6-3117	Chnahn, IL	1	EP 1	ΌX	0.5	10	0.1	ø.5	0.5	0.02	0.1	ø.s	
		2	10		0.5	ΤØ	Ŋ.T	W.5	0.5	0.32	0.1	0.5	
7-3153	Vern Hlls	1	EP T	XO	∌. 5	ΤĄ	ø.1	0.5	0.5	0.02	0.1	Ø.5	
	-	7	"		0. 5	19	9.1	0.5	ð.5	0.02	9.1	ð.5	
					0.326	6. 923	Ø.223	Ø.5	∂. 531	0.204	0.052	∌. 5	
					0.218					0.233		W	

APPENDIX C ANALYTICAL DATA



July 27, 1990 File 52-83202

Mr. Bob Strimbu ATEC Environmental Services 1501 East Main Street Griffith, IN 46319

Re:

Twenty-Four Soil for Total Metals SW 846 Method 6000 and 7000 Series

Dear Mr. Strimbu:

Enclosed are the results of the Chemical Analyses for the twenty-four soil samples which were submitted to the ATEC Environmental/Analytical Testing Division on July 16, 1990, on behalf of ACS. Metals were analyzed on a Perkin-Elmer Zeeman/5100 PC Atomic Absorption Spectrophotometer according to the 7000 series of the methods outlined in SW 846 and a ICP/EChell Plasma--Spec according to SW 846 Method 6010.

All associated quality control information will be maintained in the Testing Division files, a copy of which can be forwarded to you upon request. After a thirty-day period, a fee will be assessed for this additional information.

It has been a pleasure serving you and, as always, if there are any questions concerning these results or the ATEC Policies, please feel free to contact me.

Respectfully submitted, ATEC Associates, Inc.

John S. Sima

Environmental/Analytical

Date:

July 23, 1990

Client:

American Chemical Service

Griffith, Indiana

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

July 16, 1990

Date Received:

July 16, 1990

Date Analyzed: Analyst:

July 21, 1990

ATEC Lab Number:

EAB

900341

ATEC Project Number:

52-83202

PARAMETERS (units in mg/kg		SAMPLE	E I.D. NUMB	QUANTI- TATION	SW 846 ANALYTICAL	
unless noted)	<u>BG-7-1</u>	<u>BG-7-2</u>	<u>BG-7-3</u>	<u>BG-7-4</u>	<u>LIMIT</u>	METHOD NO.
Arsenic	< 5.0	<5.0	<5.0	<5.0	5.0	7060
Barium	160	17	5.0	5.4	5.0 (6010
Cadmium	<1.0	<1.0	< 1.0	<1.0	1.0	6010
Chromium	10	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	24	< 5.0	< 5.0	5.6	5.0	6010
Mercury	<1.0	<1.0	<1.0	<1.0	` 1.0	7470
Selenium	<1.0	<1.0	< 1.0	<1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Date:

July 23, 1990 ·

Client:

American Chemical Service

Griffith, Indiana

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

July 16, 1990

Date Received:

July 16, 1990

Date Analyzed:

July 21, 1990

Analyst:

EAB

ATEC Lab Number:

900341

ATEC Project Number:

52-83202

PARAMETERS (units in mg/kg		SAMPLE	QUANTI- TATION	SW 846 ANALYTICAL			
unless noted)	<u>BG-7-5</u>	<u>BG-7-6</u>	<u>B-25-1</u>	<u>B-25-2</u>	<u>B-25-3</u>	LIMIT	METHOD NO.
Arsenic	<5.0	<5.0	<5.0	<5.0	< 5.0	5.0	7060
Barium	5.5	< 5.0	110	16	17	5.0	6010
Cadmium	< 1.0	<1.0	<1.0	<1.0	<1.0	1.0	6010
Chromium	< 5.0	<5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	10	12	18	< 5.0	< 5.0	5.0	6010
Mercury	<1.0	<1.0	<1.0	<1.0	`<1.0	1.0	7470
Selenium	<1.0	<1.0	<1.0	< 1.0	< 1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

^{*} Method Detection Limit

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Date:

July 23, 1990

Client:

American Chemical Service

Griffith, Indiana

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

July 16, 1990

Date Received: Date Analyzed: July 16, 1990

Date Analyzed:

July 21, 1990

Analyst:

EAB

ATEC Project Number:

900341

ATEC Project Number:

52-83202

PARAMETERS (units in mg/kg		SAMPL	QUANTI- TATION	SW 846 ANALYTICAL			
unless noted)	<u>B-25-4</u>	<u>B-25-5</u>	<u>B-25-6</u>	<u>B-26-1</u>	<u>B-26-2</u>	<u>LIMIT</u>	METHOD NO.
Arsenic	<5.0	< 5.0	< 5.0	< 5.0	< 0.05	5.0	7060 •
Barium	9.3	< 5.0	< 5.0	110	6.2	5.0	6010
Cadmium	<1.0	< 1.0	<1.0	<1.0	< 1.0	1.0	6010
Chromium	< 5.0	< 5.0	< 5.0	6.0	< 5.0	5.0	6010
Lead	< 5.0	< 5.0	< 5.0	18	< 5.0	5.0	6010
Mercury	<1.0	< 1.0	<1.0	<1.0	<1.0	1.0	7470
Selenium	<1.0	<1.0	<1.0	< 1.0	<1.0	1.0	7740
Silver	<5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Date:

July 23, 1990

Client:

American Chemical Service

Griffith, Indiana

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

July 16, 1990

Date Received:

July 16, 1990

Date Analyzed:

July 21, 1990

Analyst: ATEC Lab Number: EAB

900341

ATEC Project Number:

52-83202

PARAMETERS (units in mg/kg		SAMPL	QUANTI- TATION	SW 846 ANALYTICAL			
unless noted)	<u>B-26-3</u>	<u>B-26-4</u>	<u>B-26-5</u>	<u>B-26-6</u>	<u>B-27-1</u>	<u>LIMIT</u>	METHOD NO.
Arsenic	<5.0	< 5.0	< 5.0	< 5.0	< 0.05	5.0	7060
Barium	11	5.3	< 5.0	< 5.0	26	5.0	6010
Cadmium	<1.0	<1.0	< 1.0	<1.0	5.2	1.0	6010
Chromium	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Mercury	<1.0	< 1.0	< 1.0	< 1.0	`<1.0	1.0	7470
Selenium	< 1.0	<1.0	<1.0	<1.0	<1.0	1.0	7740
Silver	<5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

^{*} Method Detection Limit

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Date:

July 23, 1990

Client:

American Chemical Service

Griffith, Indiana

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

July 16, 1990

Date Received:

July 16, 1990

Date Analyzed: Analyst:

July 21, 1990

ATEC Lab Number:

EAB 900341

ATEC Project Number:

52-83202

PARAMETERS (units in mg/kg		SAMPLE	QUANTI- TATION	SW 846 ANALYTICAL			
unless noted)	<u>B-27-2</u>	<u>B-27-3</u>	<u>B-27-4</u>	<u>B-27-5</u>	<u>B-27-6</u>	LIMIT	METHOD NO.
Arsenic	< 5.0	< 5.0	<5.0	< 5.0	< 0.05	5.0	7060
Barium	14	9.5	35	9.1	9.3	5.0	6010
Cadmium	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	1.0	6010
Chromium	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	< 5.0	10	39	< 5.0	< 5.0	5.0	6010
Mercury	< 1.0	< 1.0	< 1.0	< 1.0	`<1.0	1.0	7470
Selenium	< 1.0	<1.0	< 1.0	< 1.0	<1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

^{*} Method Detection Limit

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical



Julu 19, 1990 File 52-83202

Mr. Robert Strimbu ATEC Environmental Services 1501 East Main Street Griffith, IN 46319

Re: Seventy-Eight Soil for Total Metals

Nine Soil for EP-TOX Metals SW 846 Methods 6000 and 7000 Series

Dear Mr. Strimbu:

Enclosed are the results of the Chemical Analyses for the eighty-seven soil samples which were submitted to the ATEC Environmental/Analytical Testing Division on June 18-20, 1990, on behalf of Amerian Chemical Services. Metals were analyzed on a Perkin-Elmer Zeeman/5100 PC Atomic Absorption Spectrophotometer according to the 7000 series of the methods outlined in SW 846 and a ICP/EChell Plasma--Spec according to SW 846 Method 6010.

All associated quality control information will be maintained in the Testing Division files, a copy of which can be forwarded to you upon request. After a thirty-day period, a fee will be assessed for this additional information.

It has been a pleasure serving you and, as always, if there are any questions concerning these results or the ATEC Policies, please feel free to contact me.

Respectfully submitted, ATEC Associates, Inc.

John S. Sima

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Background #1

Sample Matrix:

Soil

Sample Taken By: Date Sampled: Robert Strimbu June 18, 1990

Date Received:

June 18, 1990

Date Analyzed:

June 18, 1990 July 11, 1990

Analyst;

EAB

ATEC Lab Number: ATEC Project Number:

900281 52-83202

PARAMETER		<u>SAMPI</u>	QUANTI-	SW 846				
(units in mg/kg unless noted)	<u>S1</u>	<u>S2</u>	<u>\$3</u>	<u>\$4</u>	<u>\$5</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.	
Total Metals	·			•				
Arsenic	<5.0	<5.0	< 5.0	< 5.0	<5.0	5.0	7060	
Barium	72	17	8.0	< 5.0	< 5.0	5.0	6010	
Cadmium	<1.0	<1.0	<1.0	< 1.0	< 1.0	1.0	6010	
Chromium	6.7	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010	
Lead	34	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010	
Mercury	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	7470	
Selenium	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	1.0	7740	
Silver	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010	
Nickel	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010	

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Background #1

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received: Date Analyzed: June 19, 1990 July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg unless noted)	SAMPLE I.D. NUMBER <u>S6</u>	QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL <u>METHOD NO.</u>
Total Metals	•		
Arsenic	<5.0	5.0	7060
Barium	12	5.0	6010
Cadmium	<1.0	1.0	6010
Chromium	<5.0	5.0	6010
Lead	8.8	5.0	6010
Mercury	<1.0	1.0	7470
Selenium	<1.0	1.0	7740
Silver	< 5.0	5.0	6010
Nickel	<5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Background #4

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990 July 11, 1990

Date Analyzed: Analyst:

Silver

Nickel

EAB

ATEC Lab Number: ATEC Project Number:

900281 52-83202

< 5.0

< 5.0

< 5.0

< 5.0

PARAMETER (units in mg/kg		SAMPL	QUANTI- TATION	SW 846 ANALYTICAL			
unless noted)	<u>S1</u>	<u> S2</u>	<u>S3</u>	<u>\$4</u>	<u>\$5</u>	<u>LIMIT</u>	METHOD NO.
Total Metals							•
Arsenic	<5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	7060
Barium	. 32	23	16	< 5.0	9.3	5.0	6010
Cadmium	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	6010
Chromium	7.2	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	42	7.3	< 5.0	< 5.0	7.3	5.0	6010
Mercury	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	1.0	7470
Selenium	<1.0	< 1.0	< 1.0	<1.0	< 1.0	1.0	7740

< 5.0

< 5.0

< 5.0

< 5.0

< 5.0

< 5.0

5.0

5.0

6010

6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Background #5

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 20, 1990

Date Received:

June 20, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900287

ATEC Project Number:

52-83202

PARAMETER		<u>SAMPI</u>	QUANTI- TATION	SW 846 ANALYTICAL			
(units in mg/kg unless noted)	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>\$4</u>	<u>S5</u>	LIMIT	METHOD NO.
Total Metals			•		•		
Arsenic	<5.0 ·	< 5.0	< 5.0	< 5.0	< 5.0	5.0	7060
Barium	45	24	31	< 5.0	9.3	5.0	6010
Cadmium	< 1.0	<1.0	< 1.0	<1.0	<1.0	1.0	6010
Chromium	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	10	< 5.0	< 5.0	< 5.0	7.3	5.0	6010
Mercury	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	7470
Selenium	< 1.0	< 1.0	<1.0	<1.0	< 1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Background #5

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 20, 1990

Date Received:

June 20, 1990

July 11, 1990

Date Analyzed: Analyst:

EAB

ATEC Lab Number:

900287

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg unless noted)	SAMPLE I.D. NUMBER <u>S6</u>	QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL <u>METHOD NO.</u>
Total Metals	•	,	
Arsenic	<5.0	5.0	7060
Barium	12	5.0	6010
Cadmium	<1.0	1.0	6010
Chromium	<5.0	5.0	6010
Lead	<5.0	5.0	6010
Mercury	<1.0	1.0	7470
Selenium	<1.0	1.0	7740
Silver	<5.0	5.0	6010
Nickel	<5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services Griffith, IN 46319

Sample Identification:

Background #6

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 20, 1990

Date Received:

June 20, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900287

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg		SAMPL	QUANTI- TATION	SW 846 ANALYTICAL			
unless noted)	<u>S1</u>	<u>\$2</u>	<u>S3</u>	<u>\$4</u>	<u>S5</u>	<u>LIMIT</u>	METHOD NO.
Total Metals	•					•	·
Arsenic	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	7060
Barium	120	56	17	6.2	5.4	5.0	6010
Cadmium	< 1.0	2.1	<1.0	1.0	1.0	1.0	6010
Chromium	6.4	15	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	8.0	120	5.7	< 5.0	7.3	5.0	6010
Mercury	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	7470
Selenium	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	5.6	22	7.2	7.5	7.4	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Background #6

Sample Matrix:

Soil

Sample Taken By: Date Sampled:

Robert Strimbu

Date Received:

June 20, 1990

Date Analyzed:

June 20, 1990

July 11, 1990

Analyst: ATEC Lab Number: EAB

900287

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg unless noted)	<u>SAMPLE I.D. NUMBER</u> <u>S6</u>	QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL <u>METHOD NO.</u>
Total Metals			
Arsenic	<5.0	5.0	7060
Barium	6.5	5.0	6010
Cadmium	<1.0	1.0	6010
Chromium	<5.0	5.0	6010
Lead	<5.0	5.0	6010
Mercury	<1.0	1.0	7470
Selenium	<1.0	1.0	7740
Silver	<5.0	5.0	6010
Nickel	<5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #1

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

PARAMETER	SAMPLE I.I	SAMPLE I.D. NUMBER				
(units in mg/kg unless noted)	<u>\$1</u>	<u>\$2</u>	TATION <u>LIMIT</u>	ANALYTICAL <u>METHOD NO.</u>		
Total Metals		•				
Arsenic	<5.0	<5.0	5.0	7060		
Barium	17	13	5.0	6010		
Cadmium	1.0	<1.0	1.0	6010		
Chromium	5.1	< 5.0	5.0	6010		
Lead	11	< 5.0	5.0	6010		
Mercury	<1.0	< 1.0	1.0	7470		
Selenium	<1.0	< 1.0	1.0	7740		
Silver	< 5.0	< 5.0	5.0	6010		
Nickel	5.2	< 5.0	5.0	6010		

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #2

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990 July 11, 1990

Date Analyzed: Analyst:

ATEC Lab Number:

EAB

900281

ATEC Project Number:

52-83202

PARAMETER		SAMPLE I	.D. NUMBER		QUANTI-	SW 846
(units in mg/kg unless noted)	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>\$4</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.
Total Metals						· .
Arsenic	<5.0	< 5.0	NT	NT	5.0	7060
Barium	120	54	20	15	5.0	6010
Cadmium	2.5	1.2	<1.0	<1.0	1.0	6010
Chromium	21	9.9	< 5.0	< 5.0	5.0	6010
Lead	63	28	. 7.1	5.9	5.0	6010
Mercury	<1.0	< 1.0	NT	NT	1.0	7470
Selenium	< 1.0	< 1.0	NT	NT	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	6.5	< 5.0	8.8	< 5.0	5.0	6010

^{*} Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #2

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

Date Received:

June 19, 1990

Date Analyzed:

June 19, 1990 July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I.D. NUMBER			QUANTI- TATION	SW 846
unless noted)	<u>S5</u>	<u>\$6</u>		<u>LIMIT</u>	ANALYTICAL METHOD NO.
Total Metals			4	•	
Arsenic	< 5.0	< 5.0		5.0	7060
Barium	42	<5.0		5.0	6010
Cadmium	2.0	<1.0		1.0	6010
Chromium	< 5.0	< 5.0		5.0	6010
Lead	28	5.2		5.0	6010
Mercury	<1.0	<1.0		1.0	7470
Selenium	< 1.0	<1.0		1.0	7740
Silver	< 5.0	< 5.0		5.0	6010
Nickel	< 5.0	< 5.0		5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Sample Matrix:

Boring #3 Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

						A Committee of the Comm	
PARAMETER (units in mg/kg		SAMPL	E I.D. NUMI	BER	QUANTI- TATION	SW 846 ANALYTICAL	
unless noted)	<u>S1</u>	<u>\$2</u>	<u>S3</u>	<u>\$4</u>	LIMIT	METHOD NO.	
Total Metals			•				
Arsenic	<5.0	12	NT	NT	5.0	7060	
Barium	71	55	18	20	5.0	6010	
Cadmium	<1.0	1.3	< 1.0	1.0	1.0	6010	
Chromium	6.7	12	< 5.0	< 5.0	5.0	6010	
Lead	< 5.0	46	9.6	< 5.0	5.0	6010	
Mercury	<1.0	<1.0	NT	NT	1.0	7470	
Selenium	<1.0	< 1.0	NT	NT	1.0	7740	
Silver	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010	
Nickel	<5.0	10	< 5.0	< 5.0	5.0	6010	

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #4

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg		SAMPI	E I.D. NUM	BER_		QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>\$4</u>	·		METHOD NO.
Total Metals	4						
Arsenic	<5.0	< 5.0	NT	NT		5.0	7060
Barium	250	51	11	8.4		5.0	6010
Cadmium	7.6	1.0	<1.0	1.0		1.0	6010
Chromium	68	< 5.0	< 5.0	< 5.0		5.0	6010
Lead	300	15	< 5.0	< 5.0		5.0	6010
Mercury	< 1.0	< 1.0	NT	NT		1.0	7470
Selenium	< 1.0	< 1.0	NT	NT		1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0		5.0	6010
Nickel	< 5.0	6.9	< 5.0	< 5.0		5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #5

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990

July 11, 1990

Date Analyzed: Analyst:

EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I	.D. NUMBEI	3	QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>S1</u> <u>S2</u> <u>S3</u>	<u>S3</u>	<u>LIMIT</u>	METHOD NO.	
Total Metals					
Arsenic	<5.0	< 5.0	NT	5.0 .	7060
Barium	170	10	12	5.0	6010
Cadmium	1.5	<1.0	<1.0	1.0	6010
Chromium	32	< 5.0	< 5.0	5.0	6010
Lead	130	< 5.0	< 5.0	5.0	6010
Mercury	<1.0	<1.0	NT	1.0	7470
Selenium	<1.0	<1.0	NT	1.0	7740
Silver	< 5.0	< 5.0	<5.0	5.0	6010
Nickel	5.3	< 5.0	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #6

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

Date Received:

June 18, 1990

June 18, 1990

Date Analyzed: Analyst:

July 11, 1990 EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE 1	I.D. NUMBER		QUANTI-	SW 846
unless noted)	<u>S1</u>	<u>S2</u>	<u>S3</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.
Total Metals				·	
Arsenic	<5.0	<5.0	NT	5.0	7060
Barium	170 ,	29	13	5.0	6010
Cadmium	1.4	<1.0	<1.0	1.0	6010
Chromium	14	< 5.0	<5.0	5.0	6010
Lead	46	5.7	< 5.0	5.0	6010
Mercury	<1.0	< 1.0	NT	1.0	7470
Selenium	<1.0	< 1.0	NT	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	5.9	< 5.0	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #7

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 18, 1990

Date Received:

10 1000

Date Analyzed:

June 18, 1990

Analyst:

July 11, 1990 EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I.D.	NUMBER	QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>\$1</u>	<u>\$2</u>	<u>LIMIT</u>	METHOD NO.
Total Metals				•
Arsenic	<5.0	<5.0	5.0	7060
Barium	28	16	5.0	6010
Cadmium	<1.0	<1.0	1.0	6010
Chromium	5.6	< 5.0	5.0	6010
Lead	14	11	5.0	6010
Mercury	<1.0	<1.0	1.0	7470
Selenium	<1.0	. <1.0	1.0	7740
Silver	< 5.0	< 5.0	5.0	6010
Nickel	9.1	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #8

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I.	QUANTI- TATION	SW 846 ANALYTICAL	
unless noted)	<u>S1</u>	•		METHOD NO.
Total Metals		• •	•	
Arsenic	<5.0	<5.0	5.0	7060
Barium	7.4	17	5.0	6010
Cadmium	<1.0	<1.0	1.0	6010
Chromium	<5.0	< 5.0	5.0	6010
Lead	10	< 5.0	5.0	6010
Mercury	<1.0	<1.0	1.0	7470
Selenium	<1.0	<1.0	1.0	7740
Silver	< 5.0	<5.0	5.0	6010
Nickel	9.8	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #9

Sample Matrix: Sample Taken By: Soil Robert Strimbu

Date Sampled:

June 19, 1990

Date Received: Date Analyzed: June 19, 1990

Analyst:

July 11, 1990

ATEC Lab Number:

EAB 900285

ATEC Project Number:

900285 52-83202

PARAMETER (units in mg/kg	SAMP	PLE I.D. NUMBER	QUANTI TATION	- SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>\$2</u>	LIMIT	METHOD NO.
Total Metals		•		
Arsenic	<5.0	<5.0	5.0	7060
Barium	10	14	5.0	6010
Cadmium	<1.0	<1.0	1.0	6010
Chromium	< 5.0	< 5.0	5.0	6010
Lead	14	< 5.0	5.0	6010
Mercury	<1.0	<1.0	1.0	7470
Selenium	<1.0	<1.0	1.0	7740
Silver	< 5.0	< 5.0	5.0	6010
Nickel	6.5	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #10

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER		SAMPLE I.D. NUMBER				SW 846
(units in mg/kg unless noted)	<u>\$1</u>	<u>\$2</u>	<u>S3</u>	<u>\$4</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.
Total Metals		·	•			
Arsenic	<5.0	< 5.0	NT	NT	5.0	7060
Barium	13	12	8.5	26	5.0	6010
Cadmium	2.0	3.3	2.4	<1.0	1.0	6010
Chromium	6.4	< 5.0	< 5.0	< 5.0	5.0	6010
Lead	19	< 5.0	< 5.0	< 5.0	5.0	6010
Mercury	<1.0	< 1.0	NT	NT	1.0	7470
Selenium	<1.0	< 1.0	NT	NT	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

^{*} Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #10

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg unless noted)	SAMPLE I.D. NUMBER S5	QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL <u>METHOD NO.</u>
Total Metals			·
Arsenic	<5.0	5.0	7060
Barium	17	5.0	6010
Cadmium	<1.0	1.0	6010
Chromium	<5.0	5.0	6010
Lead	9.3	5.0	6010
Mercury	<1.0	1.0	7470
Selenium	<1.0	1.0	7740
Silver	<5.0	5.0	6010
Nickel	< 5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #11

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER		SAMPLE I.D. NUMBER				SW 846
(units in mg/kg unless noted)	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>\$4</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.
Total Metals			,		:	
Arsenic	<5.0	< 5.0	NT	<5.0	5.0	7060
Barium	13	18	9.0	14	5.0	6010
Cadmium	2.2	3.0	<1.0	<1.0	1.0	6010
Chromium	< 5.0	7.4	< 5.0	< 5.0	5.0	6010
Lead	< 5.0	11	< 5.0	< 5.0	5.0	6010
Mercury	< 1.0	<1.0	NT	< 1.0	1.0	7470
Selenium	< 1.0	< 1.0	NT	<1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	< 5.0	< 5.0	< 5.0	< 5.0	5.0	6010

^{*} Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #12

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 11 & 17, 1990

Analyst:

CAD.

ATEC Lab Number:

EAB

< 5.0

< 5.0

< 5.0

< 5.0

ATEC Project Number:

900285 52-83202

PARAMETER (units in mg/kg	·	SAMPLE I.D. NUMBER				SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>\$2</u>	<u>S3</u>	<u>\$4</u>	TATION <u>LIMIT</u>	METHOD NO.
Total Metals						•
Arsenic	<5.0	< 5.0	NT	<5.0	5.0	7060
Barium	15	, 6.4	· 5.5	26	5.0	6010
Cadmium	1.8	< 1.0	3.4	<1.0	1.0	6010
Chromium	6.4	< 5.0	< 5.0	6.5	5.0	6010
Lead	10	< 5.0	< 5.0	27	5.0	6010
Mercury	< 1.0	< 1.0	NT	< 1.0	1.0	7470
Selenium	< 1.0	< 1.0	NT	< 1.0	1.0	7740

^{*} Not Tested

Silver

Nickel

Respectfully submitted, ATEC Associates, Inc.

< 5.0

< 5.0

< 5.0

< 5.0

5.0

•5.0

6010

6010

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #15

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received:

Date Analyzed:

June 19, 1990 July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER	SAMPLE I.D	. NUMBER	QUANTI- TATION	SW 846 ANALYTICAL <u>METHOD NO.</u>
(units in mg/kg unless noted)	<u>\$1</u>	<u>\$2</u>	<u>LIMIT</u>	
Total Metals			₹	
Arsenic	NT	NT	. 5.0	7060
Barium	11	11,	5.0	6010
Cadmium	<1.0	<1.0	1.0	6010
Chromium	< 5.0	<5.0	5.0	6010
Lead	< 5.0	< 5.0	5.0	6010
Mercury	NT	NT	1.0	7470
Selenium	NT	NT	1.0	7740
Silver	< 5.0	< 5.0	5.0	6010
Nickel	< 5.0	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #19

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

	PARAMETER		<u>SAMPLE I</u>	.D. NUMBER	QUANTI- SW 846		
	(units in mg/kg unless noted)		<u>S1</u>	<u>\$2</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.	
	Total Metals	•		•			
	Arsenic		NT	NT	5.0	7060	
·	Barium		74	17	5.0	6010	
	Cadmium		<1.0	<1.0	1.0	6010	
	Chromium		< 5.0	< 5.0	5.0	6010	
	Lead	÷ -	13	6.4	5.0	6010	
	Mercury		NT	NT	1.0	7470	
	Selenium		NT	NT	1.0	7740	
	Silver		< 5.0	< 5.0	5.0	6010	
	Nickel		< 5.0	<5.0	5.0	6010	

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #20

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER		<u>SAMPLE</u>	QUANTI-	SW 846			
(units in mg/kg unless noted)	<u>\$1</u>	<u>\$2</u>	<u>S3</u>	<u>\$4</u>	TATION <u>LIMIT</u>	ANALYTICAL METHOD NO.	
Total Metals		•					
Arsenic	<5.0	<5.0	<5.0	<5.0	5.0	7060	
Barium	130	66	12	< 5.0	5.0	6010	
Cadmium	<1.0	<1.0	<1.0	<1.0	1.0	6010	
Chromium	6.5	< 5.0	< 5.0	< 5.0	5.0	6010	
Lead	26	12	< 5.0	< 5.0	5.0	6010	
Mercury	<1.0	<1.0	<1.0	<1.0	1.0	7470	
Selenium	<1.0	<1.0	<1.0	<1.0	1.0	7740	
Silver	<5.0	< 5.0	< 5.0	< 5.0	5.0	6010	
Nickel	< 5.0	<5.0	<5.0	< 5.0	5.0	6010	

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #21

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I.D.	NUMBER	QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>S2</u>	<u>LIMIT</u>	METHOD NO.
Total Metals			-	٠
Arsenic	NT	NT	5.0	7060
Barium	43	17 .	5.0	6010
Cadmium	<1.0	<1.0	1.0	6010
Chromium	<5.0	< 5.0	5.0	6010
Lead	15	17	5.0	6010
Mercury	NT	NT	1.0	7470
Selenium	NT	NT	1.0	7740
Silver	< 5.0	< 5.0	5.0	6010
Nickel	<5.0	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #22

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I.D.	SAMPLE I.D. NUMBER		SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>\$2</u>	TATION <u>LIMIT</u>	METHOD NO.
Total Metals	•			
-Arsenic	NT	NT	5.0	7060
Barium	30	9.1.	5.0	6010
Cadmium	<1.0	<1.0	1.0	6010
Chromium	< 5.0	<5.0	5.0	6010
Lead	< 5.0	< 5.0	5.0	6010
Mercury	NT	NT	1.0	7470
Selenium	NT	NT	1.0	7740
Silver	< 5.0	< 5.0	5.0	6010
Nickel	< 5.0	< 5.0	5.0	6010

NT - Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN 46319

Sample Identification:

Boring #24

Sample Matrix:

Soil

Sample Taken By:

Robert Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 11, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE I.D. NUMBER	QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>S1</u>	LIMIT	METHOD NO.
Total Metals			
Arsenic	NT	5.0	7060
Barium	23	5.0	6010
Cadmium	<1.0	1.0	6010
Chromium	<5.0	5.0	6010
Lead	<5.0	5.0	6010
Mercury	NT	1.0	7470
Selenium	NT	1.0	7740
Silver	< 5.0	5.0	6010
Nickel	<5.0	5.0	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #2

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990

Date Analyzed:

July 17, 1990

Analyst:

Selenium

Silver

EAB

ATEC Lab Nu

900281

52-83202

MIEC	Lau Number:
ATEC	Project Number:

PARAMETER (units in mg/L	**************************************			QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>\$1</u> <u>\$2</u>		<u>LIMIT</u>	METHOD NO.
EP-TOX Metals					· · ·
			ζ.	•	•
Arsenic	<0.5	< 0.5	·	0.5	7060
Barium	<1.0	<1.0		1.0	6010
Cadmium	< 0.1	< 0.1		0.1	6010
Chromium	<0.5	< 0.5		0.5	6010
Lead	< 0.5	< 0.5		0.5	6010
Mercury	< 0.02	< 0.02		0.02	7470

Respectfully submitted, ATEC Associates, Inc.

< 0.2

< 0.5

< 0.2

< 0.5

0.2

0.5

7740

6010

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #6

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 18, 1990

Date Received:

June 18, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900281

ATEC Project Number:

52-83202

PARAMETER (units in mg/L unless noted)	SAMPLE I.D. NUMBER <u>S1</u>	QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL METHOD NO.
EP-TOX Metals	•		
Arsenic	< 0.5	0.5	7060
Barium	<1.0	1.0	6010
Cadmium	<0.1	0.1	6010
Chromium	<0.5	0.5	6010
Lead	< 0.5	0.5	6010
Mercury	< 0.02	0.02	7470
Selenium	<0.2	0.2	7740
Silver	< 0.5	0.5	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #10

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled: •

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/L	SAMPLE	SAMPLE I.D. NUMBER		QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>\$1</u>	<u>\$2</u>	•	LIMIT	METHOD NO.
EP-TOX Metals	•		•		· ·
Arsenic	< 0.5	< 0.5		0.5	7060
Barium	<1.0	<1.0		1.0	6010
Cadmium	< 0.1	< 0.1		0.1	6010
Chromium	< 0.5	< 0.5		0.5	6010
_ Lead	< 0.5	< 0.5		0.5	6010
Mercury	< 0.02	< 0.02		0.02	7470
Selenium	< 0.2	< 0.2		0.2	7740
Silver	< 0.5	< 0.5		0.5	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #11

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/L unless noted)	<u>SAMPLE I</u> <u>S1</u>	.D. NUMBER , <u>S2</u>	QUANTI- TATION LIMIT	SW 846 ANALYTICAL METHOD NO.
· ·		22	,	
EP-TOX Metals	,			
*				
Arsenic	<0.5	<0.5	0.5	7060
Barium	<1.0	<1.0	1.0	6010
Cadmium	< 0.1	< 0.1	0.1	6010
Chromium	<0.5	< 0.5	0.5	6010
Lead	< 0.5	< 0.5	0.5	6010
Mercury	< 0.02	< 0.02	0.02	7470
Selenium	< 0.2	< 0.2	0.2	7740
Silver	<0.5	<0.5	0.5	6010
<u> </u>				

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #23

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990

Date Analyzed:

July 17, 1990

Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/kg	SAMPLE	I.D. NUMBER	•	QUANTI- TATION	SW 846
unless noted)	<u>S1</u>	<u>\$2</u>	<u>S3</u>	<u>LIMIT</u>	ANALYTICAL METHOD NO.
Total Metals					
Arsenic	NT	<5.0	<5.0	5.0	7060
Barium	110	24	13	5.0	6010
Cadmium	< 1.0	< 1.0	< 1.0	1.0	6010
Chromium	23	< 5.0	< 5.0	5.0	6010
Lead	94	< 5.0	< 5.0	5.0	6010
Mercury	NT	< 1.0	< 1.0	1.0	7470
Selenium	NT	< 1.0	< 1.0	1.0	7740
Silver	< 5.0	< 5.0	< 5.0	5.0	6010
Nickel	<5.0	< 5.0	< 5.0	5.0	6010

* Not Tested

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical
Testing Division

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Boring #12

Sample Matrix:

Soil

Sample Taken By:

Rob Strimbu

Date Sampled:

June 19, 1990

Date Received:

June 19, 1990 July 17, 1990

Date Analyzed: Analyst:

EAB

ATEC Lab Number:

900285

ATEC Project Number:

52-83202

PARAMETER (units in mg/L unless noted)	SAMPLE I.D. NUMBER S1	QUANTI- TATION <u>LIMIT</u>	SW 846 ANALYTICAL <u>METHOD NO.</u>
EP-TOX Metals			
Arsenic	<0.5	0.5	7060
Barium	<1.0	1.0	6010
Cadmium	<0.1	0.1	6010
Chromium	< 0.5	0.5	6010
Lead	< 0.5	0.5	6010
Mercury	< 0.02	0.02	7470
Selenium	< 0.2	0.2	· 7740
Silver	< 0.5	0.5	6010
Nickel	< 5.0	0.5	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

Client:

American Chemical Services

Griffith, IN

Sample Identification:

Sample Matrix:

Sample Matrix:
Sample Taken By:

Sample Taken By

Date Sampled: Date Received:

Date Analyzed:

Analyst:

ATEC Lab Number: ATEC Project Number:

Boring #12

Concrete

Rob Strimbu

June 18, 1990 June 18, 1990

July 19, 1990

EAB

900281 52-83202

PARAMETER (units in mg/L	SAMPLE I.D. NUMBER	QUANTI- TATION	SW 846 ANALYTICAL
unless noted)	<u>S1</u>	<u>LIMIT</u>	<u>METHOD NO.</u>
EP-TOX Metals	·		**
Arsenic	<0.5	0.5	7060
Barium	<1.0	1.0	6010
Cadmium	<0.1	0.1	6010
Chromium	< 0.5	0.5	6010
Lead	< 0.5	0.5	6010
Mercury	< 0.02	0.02	7470
Selenium	< 0.2	0.2	7740
Silver	< 0.5	0.5	6010

Respectfully submitted, ATEC Associates, Inc.

Environmental/Analytical

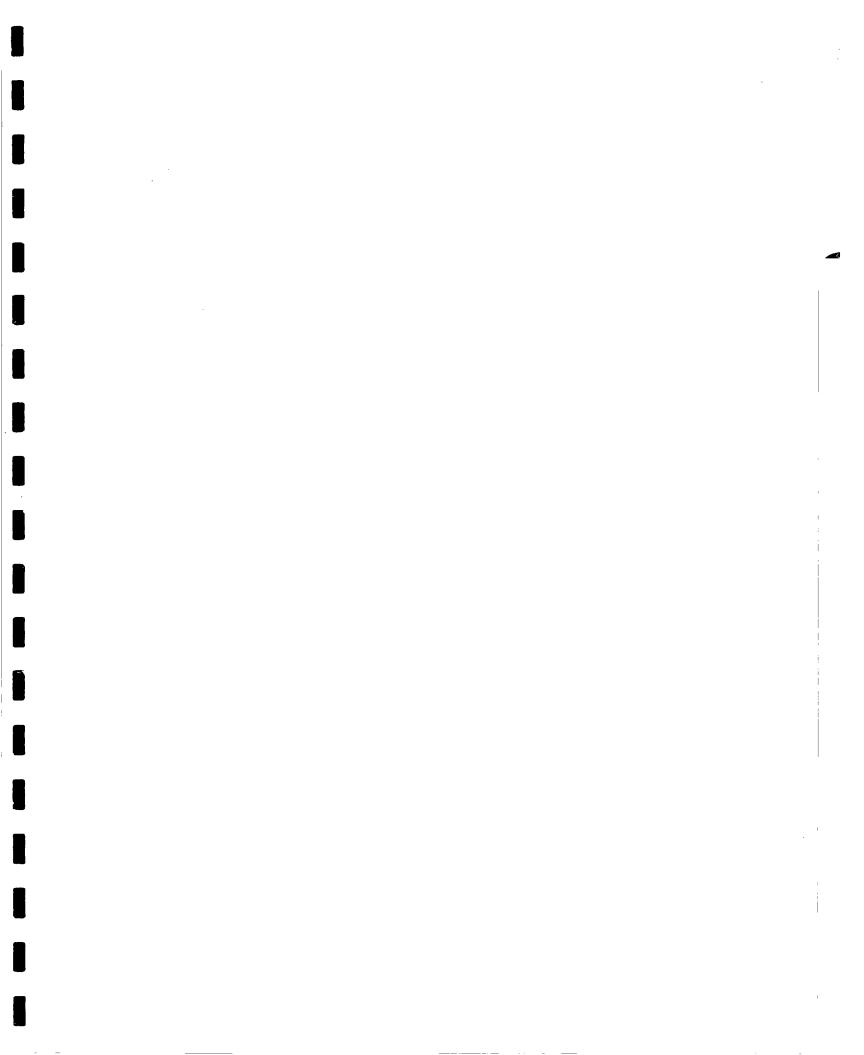
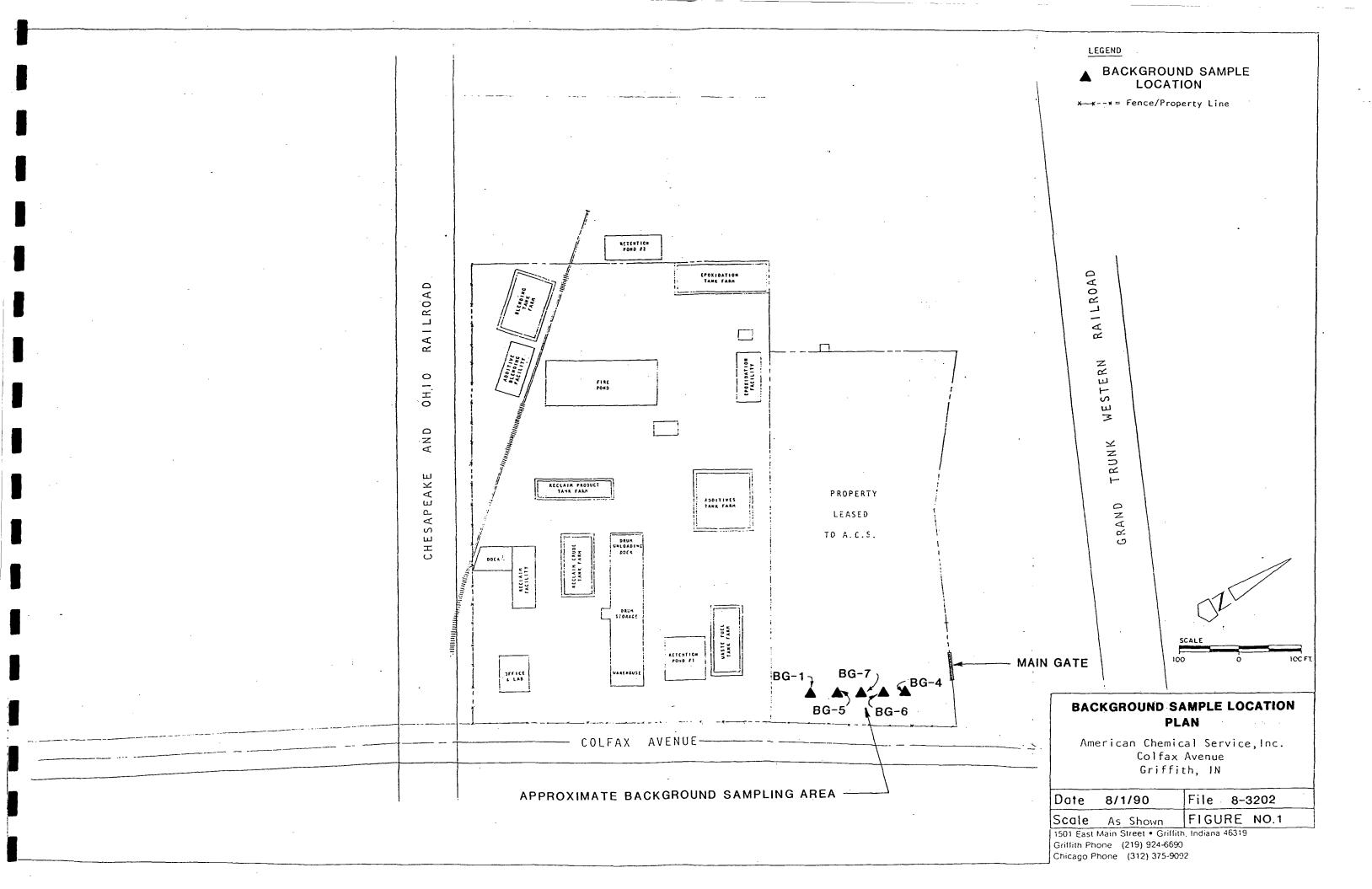
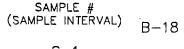
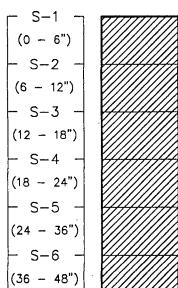


FIGURE 1 BACKGROUND SAMPLE LOCATIONS



FIGURES 2 TO 6 CONCENTRATIONS VERSUS SAMPLE LOCATIONS





$$B-1$$

Pb-10

Ba-35

Pb-39

Ba-9.1

Ba-9.3



0 .50 SCALE, FT CROSS SECTION

AMERICAN CHEMICAL SERVICES

GRIFFITH, INDIANA

DATE: 7/26/90 FILE: 8-3202 SCALE: 1" = 50' FIGURE NO.2

SAMPLE # (SAMPLE INTERVAL) B-19 B-2B-11 B-12 B-7 r S−1 Cd-1.8 Cr-5.6 Ba-74 Ba-120 (0 - 6")Cr-6.4 Ni-9.1 Ni-6.5 Pb-63 - S-2 Ba-54 Cd-3.0 $(6 - 12^{m})$ Cr-7.4 Cr-9.9 - S-3 Ba-20 Cd-3.4 (12 - 18")Ni-8.8 Pb-7.1 - S-4 Ba-26 Ba-15 Ba-14 (18. - 24")Cr-6.5 Pb-5.9 Pb-27 - S-5 Ba-42 Ba-9.5 (24 - 36") Pb-48 - S-6 Pb-5.2 (36 - 48*)

> 0 50 SCALE, FT

CROSS SECTION

AMERICAN CHEMICAL SERVICES

GRIFFITH, INDIANA

DATE: 7/26/90 FILE: 8-3202 SCALE: 1" = 50' FIGURE NO.3

SAMPLE #
(SAMPLE INTERVAL) B-20 B-3

S-1
(0 - 6") Ba-130
Br-6.5
Pb-26

Ba-66
Pb-12

Ba-55
Cr-12

S-3

(12 - 18")

⊢ S−4

(18 - 24")

Ba-250 Cd-7.6 Cr-68 Pb-300

Ba-18

Pb-9.6

Ba-20

B-4

Ba-8.4

Ba-170 Cd-1.5 Cr-32 Ni-5.3 Pb-130

Ba-170 Cd-1.4 Cr-14 Ni-5.9 Pb-46

B-6

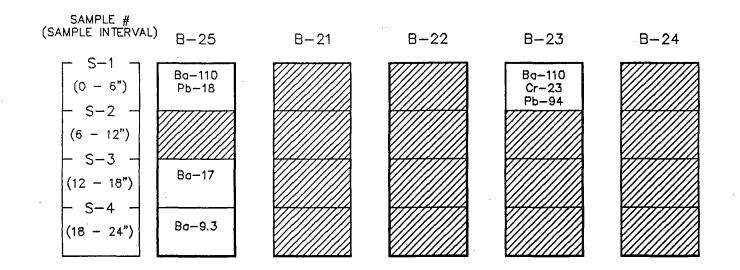
B-5

0 50 SCALE, FT CROSS SECTION

AMERICAN CHEMICAL SERVICES

GRIFFITH, INDIANA

DATE: 7/26/90	FILE: 8	-3202
SCALE: 1" = 50'	FIGURE	NO.4



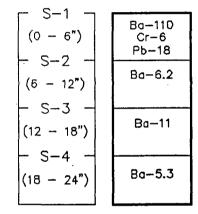
0 50 SCALE, FT CROSS SECTION

AMERICAN CHEMICAL SERVICES

GRIFFITH, INDIANA

DATE: 7/26/90	FILE: 8-3202
SCALE: 1" = 50'	FIGURE NO.5







CROSS SECTION

AMERICAN CHEMICAL SERVICES

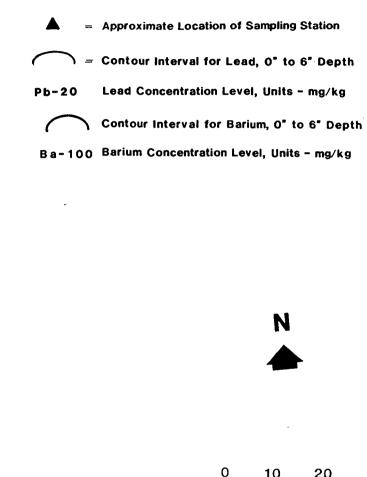
GRIFFITH, INDIANA

DATE: 7/26/90 FILE: 8-3202 SCALE: 1" = 50' FIGURE NO.6

FIGURE 7 SOIL REMOVAL PLAN

NORTH BOUNDARY FENCE LINE LEGEND = Approximate Location of Sampling Station 1 Foot Removal of Soil CONTROLLED WORK ZONE 2 Foot Removal of Soil -AUXILARY POWER HOUSE LOADING MÍXING /AREA /B-12 CONCRETE SLAB **▲** B-5 SCALE, FT SUBSOIL SAMPLING STATIONS ▲ B-24 ▲ B-22\ ▲ B-25 ▲ B-23\ SOIL REMOVAL PLAN - 700' TO EAST BOUNDARY FENCE LINE AMERICAN CHEMICAL SERVICES, INC. PROCESSING AREA FENCE LINE -GRIFFITH, INDIANA 70' TO WEST BOUNDARY FENCE LINE Date: 7/13/90 File: 8-3202 500' TO SOUTH BOUNDARY Scale: AS SHOWN | FIGURE 7 FENCE LINE 1501 E. Main Street • Griffith, IN 46319 Griffith Phone: (219)924-6690 Chicago Phone: (312)375-9092

FIGURES 8 TO 13 CONTOUR INTERVALS AND CONCENTRATION LEVELS FOR BARIUM AND LEAD



LEGEND

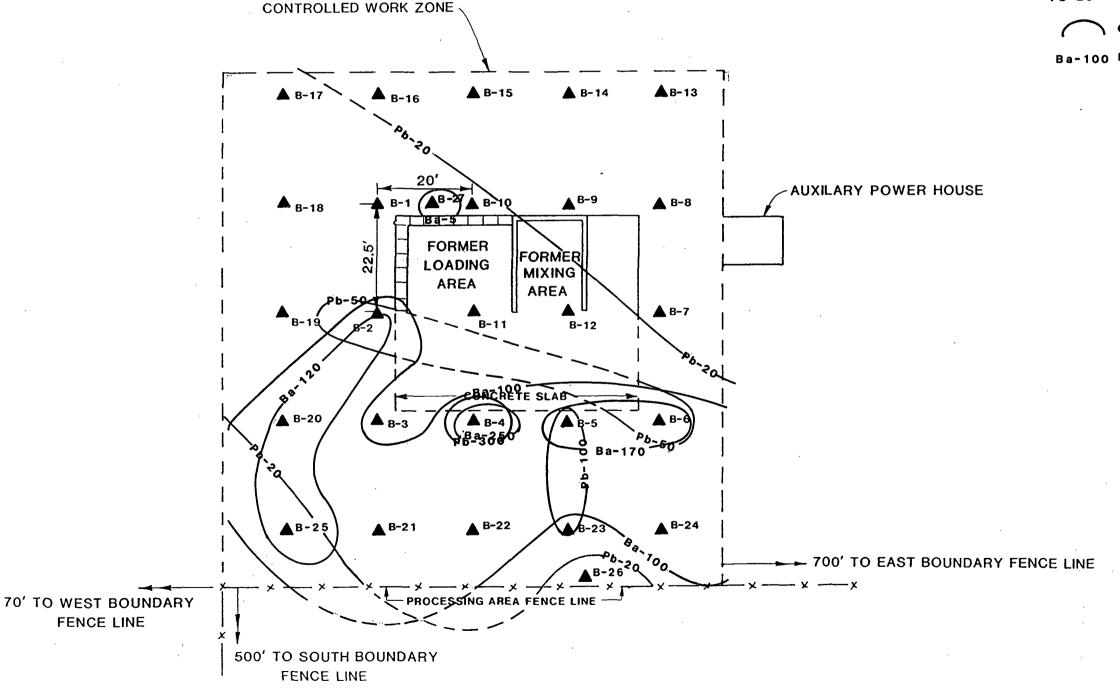
CONTOUR INTERVALS &
CONCENTRATION LEVELS FOR
BARIUM AND LEAD
0" to 6" Depth

SCALE, FT

AMERICAN CHEMICAL SERVICES, INC.
GRIFFITH, INDIANA

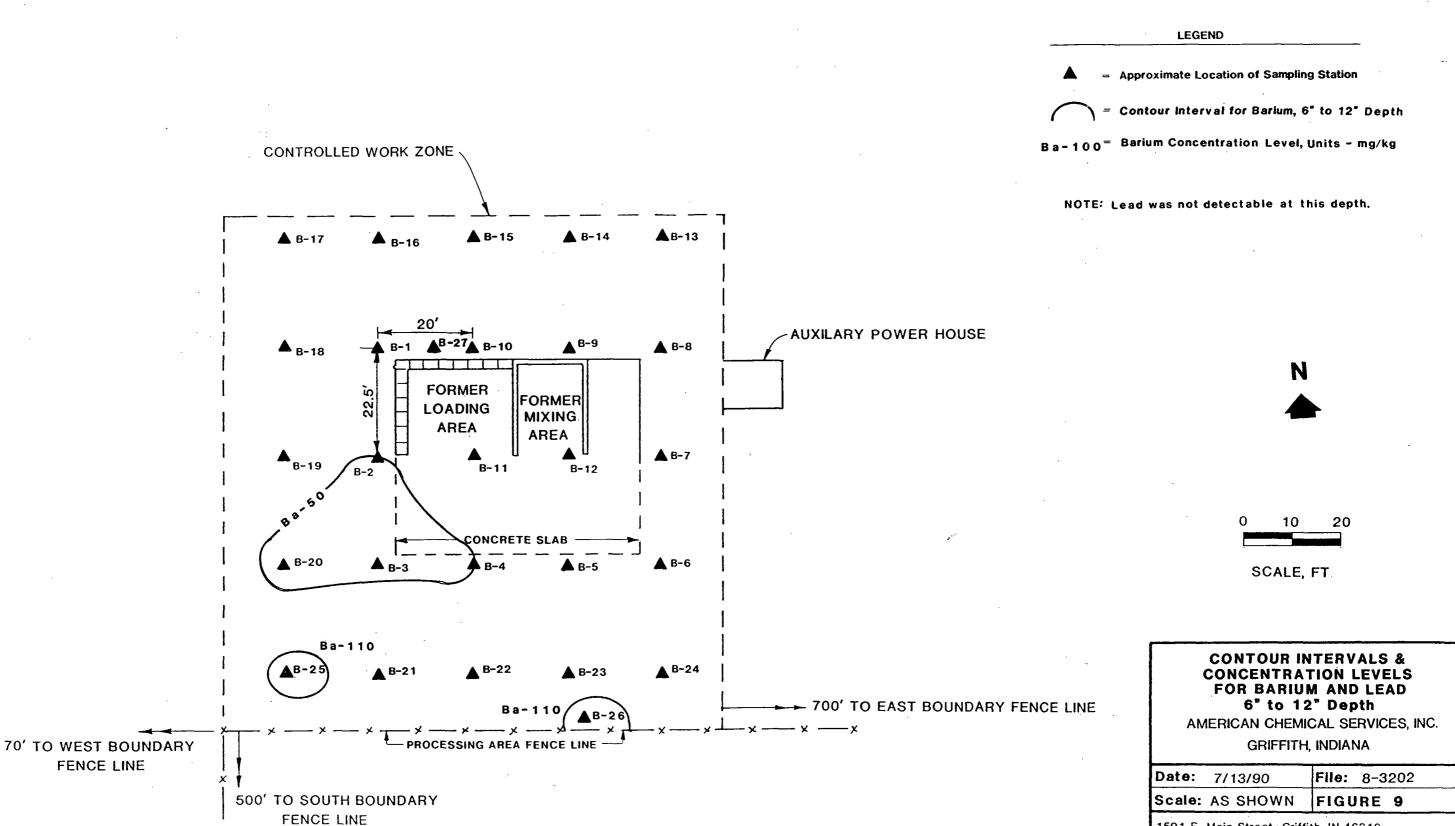
 Date:
 7/13/90
 File:
 8-3202

 Scale:
 AS SHOWN
 FIGURE
 8



NORTH BOUNDARY FENCE LINE

FENCE LINE



NORTH BOUNDARY FENCE LINE LEGEND = Approximate Location of Sampling Station = Contour Level for Lead, 12" to 18" Depth Pb-20 = Lead Concentration Level, Units - mg/kg CONTROLLED WORK ZONE = Contour Interval for Barium, 12" to 18" Depth Ba-100 = Barium Concentration Level, Units - mg/kg**AUXILARY POWER HOUSE FORMER FORMER** LOADING MIXING AREA AREA **A**_{B-19} **CONCRETE SLAB** ▲ B-20 SCALE, FT CONTOUR INTERVALS & **CONCENTRATION LEVELS** FOR BARIUM AND LEAD 700' TO EAST BOUNDARY FENCE LINE 12" to 18" Depth AMERICAN CHEMICAL SERVICES, INC. PROCESSING AREA FENCE LINE -70' TO WEST BOUNDARY GRIFFITH, INDIANA FENCE LINE **Date:** 7/13/90 File: 8-3202 500' TO SOUTH BOUNDARY Scale: AS SHOWN FIGURE 10 FENCE LINE 1501 E. Main Street • Griffith, IN 46319 Griffith Phone: (219)924-6690

Chicago Phone: (312)375-9092

NORTH BOUNDARY FENCE-LINE -----LEGEND = Approximate Location of Sampling Station = Contour Level for Lead, 18" to 24" Depth Pb-20 = Lead Concentration Level, Units - mg/kg CONTROLLED WORK ZONE = Contour Interval for Barium,18" to 24" Depth Ba-100 = Barium Concentration Level, Units - mg/kg **AUXILARY POWER HOUSE FORMER** FORMER LOADING **MIXING** AREA ▲ B-20 SCALE, FT ₹Ba-8 **CONTOUR INTERVALS & CONCENTRATION LEVELS** FOR BARIUM AND LEAD 18" to 24" Depth 700' TO EAST BOUNDARY FENCE LINE AMERICAN CHEMICAL SERVICES, INC. 70' TO WEST BOUNDARY - PROCESSING AREA FENCE LINE -GRIFFITH, INDIANA **FENCE LINE** Date: 7/13/90 File: 8-3202 500' TO SOUTH BOUNDARY Scale: AS SHOWN | FIGURE 11 FENCE LINE 1501 E. Main Street • Griffith, IN 46319 Griffith Phone: (219)924-6690

Chicago Phone: (312)375-9092

NORTH BOUNDARY FENCE-LINE LEGEND = Approximate Location of Sampling Station = Contour Level for Lead, 24" to 36" Depth Pb-20 = Lead Concentration Level, Units - mg/kg CONTROLLED WORK ZONE = Contour Interval for Barium, 24" to 36" Depth Ba-100 = Barium Concentration Level, Units - mg/kg **AUXILARY POWER HOUSE ▲** B-8 FORMER LOADING MIXING AREA ▲ B-20 SCALE, FT CONTOUR INTERVALS & **CONCENTRATION LEVELS** FOR BARIUM AND LEAD 24" to 36" Depth 700' TO EAST BOUNDARY FENCE LINE AMERICAN CHEMICAL SERVICES, INC. 70' TO WEST BOUNDARY PROCESSING AREA FENCE LINE -GRIFFITH, INDIANA **FENCE LINE** Date: 7/13/90 File: 8-3202 500' TO SOUTH BOUNDARY Scale: AS SHOWN FIGURE 12 FENCE LINE 1501 E. Main Street • Griffith, IN 46319 Griffith Phone: (219)924-6690 Chicago Phone: (312)375-9092

NORTH BOUNDARY FENCE LINE **LEGEND** = Approximate Location of Sampling Station = Contour Level for Lead, 36" to 42" Depth Pb-20 = Lead Concentration Level, Units - mg/kg CONTROLLED WORK ZONE Contour Interval for Barium, 36" to 42" Depth Ba-100 = Barium Concentration Level, Units - mg/kg**AUXILARY POWER HOUSE ▲** B-8 **FORMER** FORMER LOADING MIXING **AREA** AREA CONCRETE SLAB SCALE, FT **CONTOUR INTERVALS & CONCENTRATION LEVELS** FOR BARIUM AND LEAD 36" to 42" Depth 700' TO EAST BOUNDARY FENCE LINE ▲B-26 AMERICAN CHEMICAL SERVICES, INC. PROCESSING AREA FENCE LINE -GRIFFITH, INDIANA 70' TO WEST BOUNDARY FENCE LINE Date: 7/13/90 File: 8-3202 500' TO SOUTH BOUNDARY Scale: AS SHOWN FIGURE 13 FENCE LINE 1501 E. Main Street • Griffith, IN 46319 Griffith Phone: (219)924-6690

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